

IN THE CLAIMS:

Kindly cancel claims 1-6 and add new claims 7-26 as shown in the following listing of claims, which replaces all previous versions and listings of claims in the captioned application.

1. - 6. (canceled).

7. (new) An apparatus for processing and observing a sample, the apparatus comprising:

a sample stage for supporting a sample at a preselected location of the sample;

a focused ion beam irradiation system for irradiating the sample with a focused ion beam along an optical axis to cut out a portion from the sample; and

a side entry stage disposed over the sample stage and extending slantingly with respect to the optical axis of the focused ion beam irradiated by the focused ion beam irradiation system, the side entry stage having a microscope sample holder for picking up the cut-out sample portion directly from the preselected location of the sample and for supporting the sample portion, the microscope sample holder being configured to be removed from the side entry stage while supporting the sample portion and to be connected to an entry stage of a microscope device for observing the sample portion.

8. (new) An apparatus according to claim 7; wherein the microscope sample holder has a needle removably connected to an end thereof for picking up the cut-out sample portion directly from the preselected location of the sample and for supporting the sample portion.

9. (new) An apparatus according to claim 8; further comprising irradiating means for irradiating the sample portion with an ion beam which the sample portion is supported by the needle of the microscope sample holder.

10. (new) An apparatus according to claim 8; wherein the irradiating means comprises the focused ion beam irradiation system.

11. (new) An apparatus according to claim 7; further comprising irradiating means for irradiating the sample portion with an ion beam while the sample portion is supported by the needle of the microscope sample holder.

12. (new) An apparatus according to claim 11; wherein the irradiating means comprises the focused ion beam irradiation system.

13. (new) An apparatus according to claim 7; wherein the microscope sample holder comprises a transmission electron microscope sample holder.

14. (new) An apparatus according to claim 7; wherein the microscope sample holder comprises a scanning electron microscope sample holder.

15. (new) An apparatus according to claim 7; wherein the microscope sample holder has a needle removably connected to an end thereof; and further comprising a movement mechanism for controlling movement of the microscope sample holder to bring a tip of the needle into contact with the sample portion so that the tip of the needle picks up the sample portion directly from the preselected location of the sample and supports the sample portion.

16. (new) An apparatus according to claim 15; further comprising means for supplying a deposition gas to a contact section between the tip of the needle and the sample portion, and irradiating means for irradiating with an ion beam the contact section supplied with the deposition gas to form a deposition film for integrally connecting the sample portion to the tip of the needle.

17. (new) An apparatus according to claim 16; wherein the irradiating means comprises the focused ion beam irradiation system.

18. (new) An apparatus according to claim 16; wherein the irradiating means includes means for irradiating the sample portion with an ion beam while the sample portion

is integrally connected to the tip of the needle to thereby prepare the sample portion for observation by the microscopic device.

19. (new) An apparatus according to claim 18; wherein the irradiating means comprises the focused ion beam irradiation system.

20. (new) An apparatus according to claim 15; wherein the tip of the needle supports the sample portion by static electricity.

21. (new) An apparatus for processing and observing a sample, the apparatus comprising:

a sample chamber;

a sample stage disposed in the sample chamber for supporting a sample;

a first focused ion beam irradiation system for irradiating the sample with a focused ion beam along an optical axis to cut out a portion from the sample;

a side entry stage disposed over the sample stage and extending slantingly with respect to the optical axis of the focused ion beam irradiated by the first focused ion beam irradiation system, the side entry stage having a removable sample holder for supporting the sample portion;

a second focused ion beam irradiation system for irradiating the sample portion with a focused ion beam while the sample portion is supported by the sample holder; and

a single focused ion beam lens barrel having the first and second focused ion beam irradiation systems.

22. (new) An apparatus according to claim 21; wherein the single focused ion beam lens barrel has an internal entry stage disposed between the first and second focused ion beam irradiation systems at a position outside of the sample chamber, the internal entry stage being configured to removably receive the sample holder.

23. (new) An apparatus according to claim 22; wherein the second focused ion beam irradiation system irradiates the sample portion with the focused ion beam while the sample portion is supported by the sample holder and while the sample holder is removably received by the internal entry stage.

24. (new) An apparatus according to claim 21; wherein the sample holder comprises a microscope sample holder configured to be removed from the side entry stage while supporting the sample portion and to be connected to an entry stage of a microscope device for observing the sample portion.

25. (new) An apparatus according to claim 24; wherein the microscope sample holder comprises a transmission electron microscope sample holder.

26. (new) An apparatus according to claim 24;
wherein the microscope sample holder comprises a scanning
electron microscope sample holder.